



ARTIFICIAL INTELLIGENCE AND WAR: HOW DOES ARTIFICIAL INTELLIGENCE REVOLUTIONIZE WAR?

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ABSTRACT

This paper investigates the role of artificial intelligence in the development of the military sector and explores the current state of AI, its strengths and weaknesses, and what the future may hold. It examines the impact of AI on defense systems and presents a detailed analysis of how the USA, China, and Russia have incorporated AI into their defense strategies. Through the paper, it was found that AI is successfully being used by various countries like China, Russia and the USA. The paper finds that AI played a major role in the Russian-Ukrainian War and has immense potential to revolutionise the nature of future wars.

KEYWORDS: Artificial Intelligence, War, Defense Systems, Security, Weapons Systems, Big Data.

INTRODUCTION

In today's fast-paced technological landscape, Artificial Intelligence (AI) has emerged as a prominent factor, impacting aspects of life across the globe. The significance of Artificial Intelligence for national security has grown rapidly (Yashwanth & Jaisharan, 2019). Hence, the defense sector is also not detached from artificial intelligence. In the contemporary world where security is a core concern for most nations, the role of artificial intelligence in the military sector has become significant (O'Hanlon, 2018). Even though AI is often considered a recent development, traces of artificial intelligence and robots can be found in the past.

Artificial Intelligence has become one of the key drivers for a country's national security framework, with potentially significant applications in Defence (Cummings, 2017). AI applications cover a broad range of military operations and warfare, from intelligence gathering, data analytics, logistics, cyber security operations, command and control, information operations, and semi-autonomous and autonomous weapon systems. While there is no universally accepted definition of AI, it can be broadly defined as the ability of a computer system to perform tasks that typically require human intelligence, such as decision-making, speech recognition, and visual perception. Artificial intelligence is the result of developments in the technological sector. It is part of the Fourth Industrial Revolution (4 IR). Every industry in today's age is influenced by artificial intelligence, that is healthcare, agriculture, e-commerce, education, e-governance, transportation, etc.

As per the Parliament Library of India, *Emerging Disruptive Technologies* (EDTs) such as artificial intelligence, big data, quantum technology, robotics, autonomous systems, new advanced materials, blockchain, hypersonic weapons systems, and biotechnologies applied to human enhancements - to name a few - are expected to have a disruptive impact on the global defense industry and revolutionize future military capabilities, strategy, and operations. The Parliament Library of India also stated that AI has immense potential in algorithmic warfare, revolutionizing global military affairs. The adoption of AI in military operations is changing the experience of war, as it brings another dimension to it (warfare) with the introduction of autonomous weapons. Furthermore, as per the Journal of Big

Data: Article 1, AI has the potential to scale data analytics to a higher level with the use of Deep Learning and Neural Networks. Data is of utmost importance for defense technologies, and data collection from various military sources and equipment is essential in the training of AI systems. AI is also being successfully used in training development as well as war games and their digital simulation (Yashwanth & Jaisharan, 2019). The deployment of AI in the defense industry has also seen a surge. A report by the IBM Centre for the Business of Government (2021) states that 49% of defense organizations across the world have already implemented AI solutions and 59% have an AI strategy. Out of the 250 defense organizations surveyed, the stakeholders and leaders foresee the most significant potential of AI in ISR operations with 52% of these having implemented AI for ISR globally. Among these, 49% and 46% of the defense organizations have implemented AI for semi-autonomous & autonomous weapon systems and cyberspace respectively. Moreover, one-third of the leaders believe in the significance of AI in information operations (like deep fakes) and military logistics (Cummings, 2017).

Some potential applications of AI in warfare - according to Szabadföldi (2021) include:

1. **Autonomous Weapons:** AI can enable the development of autonomous weapons that can operate without human intervention. These weapons could potentially make faster and more accurate decisions, respond to threats more quickly, and reduce the risk of casualties on the human side. However, this also raises concerns about the potential for these weapons to malfunction, cause unintended harm, or be used in unethical ways.
2. **Decision-making Support:** AI can provide decision-making support to military commanders and policymakers. This could involve analyzing vast amounts of data to identify patterns and insights, predicting outcomes of different courses of action, and providing real-time situational awareness. This could enable more informed and effective decision-making but also raises concerns about the potential for biases and errors in the data and algorithms.
3. **Cyber Warfare:** AI can be used to develop more advanced and sophisticated cyber weapons that can

target and exploit vulnerabilities in enemy networks and systems. This could potentially disrupt communications, disable infrastructure, and compromise sensitive information. However, this also raises concerns about the potential for these cyber weapons to cause collateral damage or be used in ways that violate international laws and norms.

4. **Logistics & Supply Chain Management:** AI can optimize logistics and supply chain management in warfare by predicting demand, identifying supply chain risks, and improving the efficiency of transportation and distribution. This could reduce costs and improve the effectiveness of military operations.
5. **Surveillance & Reconnaissance:** AI can be used to develop advanced surveillance and reconnaissance systems that can detect and track enemy movements, identify potential threats, and provide real-time intelligence to military personnel. This could improve situational awareness and enable more effective planning and execution of military operations.
6. **Training & Simulation:** AI can be used to develop advanced training and simulation systems that can provide realistic and immersive training experiences for military personnel. This could improve their skills and readiness for combat, while also reducing the risk of injury and death during training exercises.
7. **Medical Support:** AI can be used to develop advanced medical support systems that can diagnose and treat injuries and illnesses more quickly and accurately. This could improve the survival rates and recovery times of injured soldiers, while also reducing the burden on medical personnel.
8. **Target Simulation:** AI systems have the ability to predict enemy behavior, anticipate vulnerabilities, weather, and environmental conditions, assess mission strategies, and suggest alleviation plans. This can save time and human resources, putting soldiers a step ahead of their targets.

Precedence

An example of technology with similar capabilities to AI being used in the past is the use of radar during World War II. Radar technology allowed military forces to detect incoming enemy aircraft and ships, giving them an advanced warning and allowing them to prepare for an attack. This technology was critical in helping the Allies win the Battle of Britain and played a significant role in the outcome of the war.

In addition, during the Cold War, the United States and the Soviet Union both developed early warning systems that used automated processes to detect and track incoming missiles (Sharma, 2022). These systems relied on advanced technology and algorithms to quickly analyze data and provide alerts to military leaders, giving them time to respond to a potential attack.

Overall, while the use of AI in warfare and crisis situations is a relatively new development, technologies with similar disruptive capabilities have been used in the past to support soldiers and responders in various ways. These early examples demonstrate the potential benefits of using advanced technology to support military operations and protect against threats.

Present Use of AI by Various Countries

The United States, China, and Russia have already integrated AI into their military operations, with the US using AI in warfare

operations in Iraq and Syria (Sayler, 2020). Despite a \$300 billion difference in defense budgets, as per the New York Times (2017), China is investing heavily in AI and aims to lead the global AI market by 2030. As per the Defence Technical Information Centre (2020), China is successfully implementing its military-civil fusion strategy by using AI for simulators, training programs, and autonomous weapon systems. President XI Jinping has called for treading the path of 'military-civil fusion-style innovation'; this has also found its place in the national strategy of China. Some of the projects in the direction are — the 'Military-Civil Fusion National Defense Peak Technologies Laboratory' launched by Tsinghua University and the development of the Blowfish A2 model in collaboration with a company named Ziyen UAV. Russia is also actively developing AI-enabled weapons, with a focus on robotics and autonomy on the battlefield (Defence Technical Information Centre, 2020). They are making significant investments in the development of AI-based systems for information operations, detection analysis, and countering disinformation. These countries recognize the potential of AI in modern warfare and are investing heavily in its development and implementation.

The case of India will be discussed to represent the developments of this subject in middle-income developing countries. Although its implementation in the military domain is at a nascent stage, India is making significant strides in implementing AI-enabled systems for its military and surveillance projects, with an expected contribution of 1.3% to the country's annual growth rate by 2035 (Niti Aayog, 2019). The Defence Research & Development Organization (DRDO) leads India's AI research in defense, focusing on artificial neural networks, deep learning, computer vision, and situational awareness. The Defence AI Council (DAIC) was established in 2019 to provide strategic direction for AI adoption in defense and a multi-stakeholder Task Force was formed to study the strategic implications of AI from a national security perspective (Ministry of Defence of India, 2022). The DAIC and Defence AI Project Agency (DAIPA) were provided with a Rs 1000 crore annual budget for AI-enabled projects. The Defence Ministry's AI Roadmap includes 61 defense-specific projects, and 12 AI domains have been identified, including the adoption of AI in the Indian army for C4ISR. Various centers have been established across the country, and defense start-ups such as BOTLABS, Torus Robotics, EyeROV, IdeaForge, Vinveli, and Optimised Electrotech are working on the militarisation of AI. India's defense startups that are working rigorously in the field of militarisation of AI are funded by the Ministry of Defense (MoD) or Innovations for Defence Excellence (IDEX).

Case Study: Russia-Ukrainian War

The conflict between Russia and Ukraine has become a prime example of how Artificial Intelligence (AI) is being used in modern warfare. Both sides have employed AI-enabled software, cyber-attacks, deep fakes, and disinformation campaigns to disable each other's critical infrastructure. The United States is also using this conflict as a testing ground for its AI-enabled systems. Project MAVEN, for instance, has used drone footage to gather and classify information for detecting objects of interest (Congressional Research Service, 2019).

The US is also using AI and machine learning algorithms to collect and analyze battlefield data to generate intelligence about Russian command and control strategies. The Ukrainian military has employed various technologies, including People's Drone PD-1/PD-2, RZ-500 attack drone, ST-35 Silent Thunder loitering munition drone, Hunter RSVK-M2 unmanned ground vehicles, robotic platforms Dwarf and Scorpion-3, and anti-

aircraft missile system Stugna-P (Kryvenko, 2022). AI-based software like Space Know has been used to detect geospatial activity, and a US-based private firm, Clearview AI, provided free access to Ukraine to track Russian soldiers through their software.

However, as per Times of India (2022), the conflict has also seen destructive AI-enabled software being used by Russian intelligence which compromised hundreds of computers at Ukrainian government agencies. Russian stock exchanges, the foreign ministry, and other government websites were also targeted by hackers.

This conflict highlights the importance of using the latest weapons, modern intelligence, data transmission, control, and destruction systems, which, at least in part, contain an "artificial intelligence" component. It can be surmised that contemporary armed conflict cannot be successfully resolved without the use of these technologies.

Prospects of Future Developments at the War Front Due to the Advent of Artificial Intelligence

AI is deployed in almost every military application, and increased research and development funding from military research agencies to develop new and advanced applications of artificial intelligence is projected to drive the increased adoption of AI-driven systems in the military sector.

For instance, the US Department of Defense's (DoD) Defense Advanced Research Projects Agency (DARPA) is financing the development of a robotic submarine system, which is expected to be employed in applications ranging from the detection of underwater mines to engagement in anti-submarine operations (Singh & Gulhane, 2018). Additionally, the US DoD overall spent USD 7.4 billion on Artificial Intelligence, Big Data, and Cloud technologies in the fiscal year 2017, while China is relying on AI to enhance its defense capabilities and is expected to become the world leader in this field by 2030 (Department of Defence, 2012).

An analysis by MarketsandMarkets (2018) indicates that the market size of artificial intelligence in the military is expected to reach USD 18.82 billion by 2025, at a CAGR of 14.75% from 2017 to 2025.

Most aspects of the nuclear situation are unlikely to change. Missile defenses may improve and may include lasers for point defense in some places. The Point Defense Laser (PDL) is an ability that some units of the USA possess. The PDL fires a laser that disables missiles in flight, making it the first Military Laser Weapon in the US Army. A laser weapon system, either space-based or ground-based, needs to locate the missile (acquisition) and track its motion (tracking) (Defense Technical Information Center, 1998). These laser defenses could help protect ships, ports or airfields against various types of attack.

Satellites in space are likely to remain highly vulnerable to nuclear attack. That is especially true of satellites in low Earth orbit (LEO), as they are located at altitudes similar to those traversed by ballistic missiles on typical flight trajectories, so they can be attacked by ballistic missile defense technologies. Such objects are also vulnerable, over a period of months, to the residual effects of nuclear detonations in the Van Allen belts—areas of the Earth's magnetic field where protons and electrons generated by nuclear explosions can "get stuck," damaging satellites on each orbital pass (O'Hanlon, 2018).

As per a report by O'Hanlon (2019), by 2040, many cyber systems controlling NATO weaponry and other platforms should be more resilient to attack. That is because NATO will have had two decades to address problems that are now widely understood.

Drawbacks

While AI technology has many benefits, there are also some drawbacks that need to be considered. One of the major concerns with using AI-based technology is an investment in terms of both money and skills. Especially for middle-income countries like India, where a lot of the population is still living under the poverty line. The question arises - how much can the country afford to provide infrastructure capabilities for building such technology when millions toil away in poverty? The possible solution is that policymakers must decide on what AI program is necessary for the security of the nation and work towards it.

Another main drawback is the potential for data tampering and misrepresenting data in the training process. This can lead to inaccurate results and potentially dangerous outcomes. Something to note is the ethical and societal questions that arise when using AI in warfare. It is important to carefully consider the implications of using AI in this context and ensure that it is guided by principles of ethical and responsible use. Additionally, appropriate oversight and accountability mechanisms should be implemented to ensure that the technology is used responsibly and safely.

The ITU Secretary-General had said, "A dystopian future is also possible, in which AI destroyed jobs and enabled an uncontrollable spread of disinformation, or in which only wealthy countries reaped the benefits of the technology". The UN human rights chief Volker Türk had warned about the rapid and unchecked advances in generative AI. He said that "human agency, human dignity, and all human rights are at serious risk", calling for governments and businesses to anchor the technology's development in rights considerations." On 14 June 2023, Guterres expressed his preference for UN member states to create an organization to oversee and regulate the development of AI. The agency would operate similarly to the IAEA, which develops and publishes policies and guidelines promoting the safe use of nuclear energy, whilst monitoring and enforcing safeguards preventing the technology's use for weapons development.

CONCLUSION

It was found that AI had a major influence on the Ukraine-Russia war. Countries like the USA, Russia, and China are actively inducing artificial intelligence in the military sector. They are leading competitors in this regard. India is far behind these countries in terms of artificial intelligence. Overall, while AI technology has the potential to transform military capabilities, it is important to carefully consider the potential drawbacks and ensure that it is used in a responsible and ethical manner. In the future, it is important to regulate the development of AI weaponry. The UN should take regulatory measures on humanitarian grounds.

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